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Gr Time Series Filter version 2006/06/28
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INSTALLATION and CONFIGURATION (usually done as user nwis):

1. If the Java Runtime Environment Version 5.0 is not already installed,
download and install it from:
http://java.com/en/download/index.jsp
To check which version is currently installed, type:
/usr/bin/java -version

2. Unzip the gr_filter.zip distribution file to the location of your choice on
the
ADAPS server.  The default pathname is /usr/opt/nwis/local/util/gr.

3. cd to the 'gr' directory created

4. Edit the 'grfilt' script file, and change the pathname for 'GRHOME' to the
location of the gr directory (if different than the default location:
setenv GRHOME /usr/opt/nwis/local/util/gr).

5. Edit the 'gr_filter' script file and change the path name for 'GRHOME' to the
location of the gr directory (if different than the default location:
GRHOME=/usr/opt/nwis/local/util/gr).

6. Make both gr_filter and grfilt exectuable:
chmod 750 gr_filter
chmod 750 grfilt

7. Copy the 'gr_filter' script file from the gr directory to a common command
directory where all users will have access to execute it.  It could be
/usr/opt/nwis/local/util, or wherever you place all of your other OSW scripts,
so long is it is in NWIS user's $path.

8. Create DDs in all desired sites with a parm code of 72137.

9. In DECODES:
 A. Import the supplied DECODES Device file 'grfilt_device'
     decodes > Devices > Devices > Import device(s)
 B. Import the Device Configuration File 'grfilt_decodes_config'
     decodes > Devices > Device configurations > Import DCF
 C. Link all sites you will be wanting to run the tide filter on.
     decodes > Sites > EDL device > Add

******************    IMPORTANT NOTE    **************************
***  The time specified in the DECODES SITE Definition MUST be UTC ***
***  as all operations of grfilt use only UTC time:          ***
***                                                          ***
***       ARE THE DATA RECORDED IN LOCAL OR UTC TIME?:   U   ***
***                                                          ***
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PROGRAM OPERATION:

The gr_filter program is a user interface between ADAPS and the grfilt program.
grfilt uses a Godin filter to remove the influence of tides from a time series.
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This process resamples the series to hourly increments, on the hour, using linear
interpolation,and then applies three moving averages. The first is 12-1-11 hour,
the second is 11-1-12, and the third is 12-1-12. The output is on an hourly increment.

The Godin filter lacks the precision and flexibility of a digital filter, but
is more predictable. The Godin algorithm always drops exactly 35 hourly data
points from the beginning and end of the input series. Unlike a digital filter,
appending new data points to the input series will not cause a change in
previously-calculated filtered values.

The main drawback of the Godin filter is that it smooths the data and misses
events at certain frequencies. Therefore, a more flexible digital filter
may be included in a future release in order to provide detailed analysis
capabilities. Godin would still be the preferred choice for storing and appending
filtered series, because existing results are guaranteed not to change. It
should be well suited for storing daily averages, since higher frequency variation
is lost anyway.

The Godin filter requires at least 71 continuous hours of data to create output.
Gaps in the input series are expanded to begin and end on the hour, and then
expanded by an additional 35 hours on both sides of the gap. Detailed gap
information is written at run time.

By default, gaps of less than one hour are filled using linear interpolation.
This threshold can be changed by adding '-gap=val' just before the '$1' on the
last line of the grfilt script file. 'val' should be a numerical value followed
by a unit indicator, such as 's' for seconds, 'm' for minutes, 'h' for hours, or
'd' for days. For example '-gap=90m' would cause gaps of less than 90 minutes to
be filled using linear interpolation.

--- User interface: gr_filter

gr_filter will ask for a station number, DD number, and beginning and ending
dates (in YYYYMMDD format). These must define a Discharge DD and a date range
that contains COMPUTED Unit Values. The nwts2rdb program is run to retrieve
the data to be filtered from ADAPS. Data are retrieved in UTC time.

grfilt itself is then run on the retrieved data. If there are no data or
insufficient data for grfilt to produce any filtered output, the program will
halt with an error.

If grfilt is successful, the DECODES command line program 'cvtstd' will be run
to convert it into an ADAPS Standard Data Input file format (.std file) and
the user will be reminded to review the .sum file created. The user will then
manually load the .std file into ADAPS with std_stor (ADAPS IN 8 usually).

Optionally, the DBA can modify gr_filter to automatically load the data into
ADAPS by uncommenting those lines at the end of the gr_filter program.

At any prompt, the user may exit the gr_filter program by entering 'ex' or 'EX'.

REQUIREMENTS AND ASSUMPTIONS:

1. The station must have a DD for parameter code 72137 (Discharge, tidally filtered, cubic feet per second).

2. The input site will have the DECODES DCF "GRFILTF-GR-001" linked to parm code 72137.

3. There will be one and only one DECODES config for this purpose, and it will be called GRFILTF-GR-001, as the cvtstd is hardcoded to Device GRFILTF, sequence number 001.

4. If data is to be automatically loaded back into ADAPS, the user must have write access to ADAPS. Of course, the user must have at least read access in order to retrieve data from ADAPS.

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